

**RESPONSE TO EPA AND CDH  
COMMENTS ON THE DRAFT  
SURFACE WATER INTERIM MEASURES/  
INTERIM REMEDIAL ACTION PLAN  
AND DECISION DOCUMENT**

**903 PAD, MOUND, AND  
EAST TRENCHES AREAS**

**OPERABLE UNIT NO. 2**

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant  
Golden, Colorado

**ENVIRONMENTAL RESTORATION PROGRAM**

**September 1990**

ADMIN RECORD

REVIEWED FOR CLASSIFICATION/CONTROL

By [Signature]  
Date 11/11/91

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BY S. L. CUNNINGHAM

Date 9/17/90 (✓)

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OPERABLE UNIT NO. 2**

Rocky Flats Plant  
Golden, Colorado

September 1990

Prepared by:

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**SECTION 1**  
**RESPONSE TO EPA COMMENTS**

## SECTION 1

### RESPONSE TO EPA COMMENTS

#### GENERAL COMMENTS

##### Comment 1:

*The draft document must be updated to reflect appropriate provisions of the IAG (upon effective date) including but not limited to schedules, ARAR's, community relations, and field safety/operating procedures.*

*The nature of the plutonium identified in surface waters (dissolved, colloidal, suspended) is reportedly the subject of ongoing studies within DOE. The results of such investigations have direct bearing on the design of interim measures for OU 2, and the future success or failure thereof. These studies are not specifically described or referenced, yet broad conclusions are made as to the nature and extent of plutonium contamination present and the appropriate response. The studies and investigations used to support these conclusions must be specifically cited with pertinent information presented within the IM/IRA or made available for technical review before the validity of their application in this context can be ascertained.*

*The function of this action within the overall RI/FS effort for OU 2 and RFP, as defined by the IAG, should be clearly presented and reiterated at appropriate points to explain, for example, that the investigation does not extend to areas farther downstream in the drainages as they are being studied separately under OU 5 (Woman Creek), and OU 6 (Walnut Creek).*

##### Response:

Modifications pertaining to schedule and ARARs have been made to Sections 3.1 through 3.3 in the draft final IRAP/EA. In Section 3.2, this reader is now referred to the Federal Facility Agreement and Consent Order (FFACO)/Inter-Agency Agreement (IAG) for the most current schedule. Compliance with potential ARARs, Section 3.3, has been modified to include the requirements of the March 1990 NCP. It is felt that field safety operating procedures are best addressed in the Site-Specific Health and Safety Plan and the Occupational Safety Analysis for the project. These plans are potential health effects pertaining to disturbance of plutonium contaminated surface soil is discussed in Section 7. Community relations activities will be addressed in the Responsiveness Summary.

Section 2.3.5.1 has been modified to note the on-going study within DOE pertaining to the size distribution of plutonium in surface water at OU 2. It is important to emphasize that although the results of this DOE study may be informative with regard to the surface water IM/IRA, the bench- and field-scale treatability studies will provide information specific to treatment of OU 2 surface waters.

The function of the IM/IRA within the overall RI/FS effort is discussed in Section 1. Reference is now made to the meetings between DOE, EPA, and CDH where agreement was reached on the locations for contaminated surface water collection, which defines the scope of the IM/IRA.

#### SPECIFIC COMMENTS

##### Comment 2:

###### Section 1.1, Page 1-2.

*The last paragraph of this section indicates that bench testing is underway and mobile field treatment facilities will be installed and operated to test several treatment processes using water from an OU 2 seep. As this is the only section this action is mentioned, the role of this activity within the IM/IRA is not clear; particularly since it includes possible field testing of ion exchange, which is subsequently*

*eliminated from consideration for use at OU 2 (See Section 5.2). The field treatability testing, if it is to be conducted as part of the IM/IRA for OU 2, must be completely integrated into the process and into this document. This must include a presentation of the schedule, extent, and objectives of such testing; a description of how the results obtained will be used to optimize the process design or operation of the IM/IRA treatment system; and a discussion of where this effort fits within the areawide treatability study scheduled for completion under the IAG.*

Response:

In response to this comment, we have expanded the discussion of treatability studies and moved it to Section 6.4. The revised discussion is as follows:

The DOE will conduct bench- and field-scale treatability studies to determine the effectiveness of cross-flow membrane filtration, granular-activated carbon, ion exchange and other technologies in treating OU 2 surface waters. Objectives of the bench-scale study include optimization of operating parameters, evaluation of performance relative to meeting chemical-specific ARARs and reevaluation of capital and operating costs. Activated carbon will be tested using a mobile field treatment unit which will be deployed in the Mound Area for treatment of surface water from stations SW-59 and SW-61. This water is the most likely OU 2 surface water to contain methylene chloride, vinyl chloride, and acetone, if these analytes are present in OU 2 surface waters at all. The initial operational of the mobile field unit is expected to be installed in February 1991 with start up in March 1991. Because the field unit will be used to demonstrate organic containment removal efficiencies, it will not be expected to attain chemical-specific ARARs for metals and radionuclides. Additional units will be added over a several month period to evaluate metals and radionuclides removal. A summary report of the treatability study findings will be submitted to the regulatory agencies upon completion of the program. The results of these tests and the bench-scale treatability studies may indicate it is not practicable to attain all potential ARARs for the surface water IM/IRA. Final performance requirements for the IM/IRA will require approval by the regulatory agencies.

Comment 3:

Section 2.2.2.1:

*Check the use of the word "uncomfortably"*

Response:

Section 2.2.2.1, Surficial Materials, has been modified, expanded, and retitled "Alluvial Materials." The word "uncomfortably" has been removed from the text.

Comment 4:

Sections 2.2.2 and 2.2.3:

*The generalized descriptions presented here should be updated and made as site-specific as possible based on ongoing boring/trenching programs, and related to subsequent conclusions on the movement and interaction of surface and ground water within OU 2.*

*The lengthy descriptions of the drainages and pond systems are not necessary or appropriate here, except as related directly to the seeps.*

Response:

Sections 2.2.2 and 2.2.3 have been completely revised and expanded pursuant to this comment. More site-specific detail is provided, and to the extent possible with existing data, interaction between surface water and ground water is further discussed.

The discussions on the drainages and pond systems contained in Section 2.2.3 are included to provide as complete an insight to the site characterization as possible with the data available. An understanding of the drainages and pond systems are an integral part of evaluating, designing and development of a preferred collection and treatment system for OU 2.

Comment 5:

Section 2.2.3.2:

*The statement that the ground water in surficial materials is hydraulically connected to Arapahoe formation waters should be qualified to indicate this is true only for shallower portions of the Arapahoe formation.*

*The strong downward vertical gradient observed between ground water in surficial units and that in bedrock cannot be interpreted as indicative of a high conductivity contrast between the sandstones and claystones, as these are both bedrock units.*

*The average ground-water velocity of 145 ft/yr cited for the Woman Creek Alluvium is significantly lower than estimates provided previously. The source of this value and an explanation of this discrepancy must be provided.*

Response:

The introductory paragraph of Section 2.2.3.2, states that the ground water in surficial materials and in Arapahoe sandstones and claystones at OU 2 are hydraulically connected at shallower portions of the Arapahoe Formation.

Because the referenced bedrock ground water is in Arapahoe sandstone, the strong downward vertical gradient implies a relatively high hydraulic conductivity contrast between the sandstone and overlying claystone. The field hydraulic conductivity measurements support this conclusion.

The average ground-water velocity of 145 ft/yr cited for the Woman Creek Alluvium is a direct quote from the Draft Remedial Investigation Report for 903 Pad, Mound, and East Trenches Areas, (December 1987).

Comment 6:

Sections 2.2.4 - 2.2.7:

*These discussions are not required as part of the IM/IRA plan.*

Response:

These sections have been included to satisfy NEPA and DOE requirements. A DOE notice issued on August 2, 1988, entitled "Integration of Environmental Compliance Processes," (DOE-N-5400.4),



established a DOE policy for meeting CERCLA and NEPA requirements for hazardous substance remedial action projects. Quoting directly:

Effective immediately, it is DOE's policy to integrate the requirements of the NEPA and RI/FS processes for remedial actions under CERCLA.

Comment 7:

Section 2.3:

*This section could be improved by replacing much of the text listing values and locations with a brief, simplified table for each media, similar to Table 2-1 for Unconfined Ground Water. The text should be reserved for interpretation of what the values mean to the IM/IRA effort, and identification of sources when possible, both of which are notably absent in the existing version. This must include a better evaluation of the significance of observed contamination with organics such as vinyl chloride, methylene chloride, and acetone, which are not amenable to treatment by the recommended process (see Section 4.4.3.1).*

Response:

Section 2-3 has been modified in response to this comment. The text is more focussed in describing contamination relevant to the IM/IRA, and tables have been prepared (Appendix A) that concisely summarize the chemistry data for each medium. Vinyl chloride, methylene chloride and acetone have not been found to be above ARAR at proposed surface water collection points. This is discussed further in Section 4 and in the footnotes to Table 4-1.

Comment 8:

Section 2.3.1:

*Currently available results of sampling completed subsequent to the December 1989 background report should be incorporated into the interpretation of inorganic contamination within OU 2.*

Response:

Although some sampling analyses have been completed subsequent to December 1989, all analytical data must be evaluated and validated prior to inclusion into this report. It is unlikely that more recent background data will alter the conclusions regarding contamination at OU 2, especially as they apply to the IM/IRA.

Comment 9:

Section 2.3.2:

*The most recent data should be incorporated into the ground-water characterization during document revisions.*

Response:

See response to comment on Section 2.3.1.

Comment 10:

Section 2.3.2.2:

*Statements made within the IM/IRA Plan regarding the comparison of quarterly field data to "background" data from a quarter other than that for which the field data is representative must be explicitly referenced as a qualitative comparison.*

Response:

The text has been revised to discuss all chemical data regardless of the quarter it was collected. These data are compared to the one data set of background levels recognizing seasonal fluctuations in background levels are possible. As stated in Section 2.3.1, the background data has been used to preliminarily characterize inorganic contamination.

Comment 11:

Section 2.3.3.1:

*The IM/IRA Plan must use background information appropriately. There is no significance to the fact that a field-generated data point is less than two times the background upper tolerance limit.*

*The information generated during the Phase I RFI/RI for OU 2 does not provide the information needed to verify that the radioactive contamination is limited to surficial soils.*

Response:

Background data has been used appropriately. The reference to measured contaminant levels exceeding background levels by a certain margin and frequency is included to provide the reviewer with a general indicator of the magnitude of contamination.

It is true that the Phase I RFI/RI does not provide information that verifies that the radionuclide contamination is confined to surface soils; however, the circumstantial evidence strongly implies this to be true. As stated in the revised text, the EG&G radiological survey further demonstrates surface contamination by radionuclides.

Comment 12:

Section 2.3.3.2:

*There is inadequate information to demonstrate that organic contamination at SWMUs 108 and 158 does not exist.*

Response:

For improved clarity, this portion of the document has been revised. The Mound Area has been deleted as a specific subsection of Section 2.3.3 and replaced with the following statements:

The Mound Area, like other portions of OU 2, contained acetone (hundreds of  $\mu\text{g/l}$ ) and methylene chloride (typically tens of  $\mu\text{g/l}$ ) at concentrations too low to unambiguously demonstrate contamination with these compounds. Other organic constituents in the Mound Area (PCE,  $\text{CHCl}_3$ , 1,2-DA) were less

numerous at lower levels than at other areas within OU 2. Semi-volatile organic compounds di-n-Butyl phthalate, bis(2-Ethylhexyl) phthalate, and N-nitrosodiphenylamine were detected in numerous boreholes throughout OU 2 (see Table A-11, Appendix A).

Comment 13:

Section 2.3.3.3:

*The last paragraph on page 2-33 refers to VOC contamination due to a release from Trench T-2. It seems that this paragraph must be misplaced and does not belong in this section.*

Response:

The commentor is correct; the paragraph was misplaced and has been removed in the revised text.

Comment 14:

Section 2.3.4.1:

*SED-1, SED-2, SW-1 and SW-2 locations should be presented on Figure 2-9.*

Response:

The above-referenced sediment and surface water monitoring stations were omitted from Figure 2-9 for technical reasons. These stations are located approximately 5,000 feet southeast of SW-26/SED-24. In order to include these stations on this figure, the scale would have to be modified from the present 1" = 600' to a scale of 1" = 1000'. This would reduce much of the print to an illegible size. It is our opinion that a separate map or plate identifying the locations of these stations is not necessary because they are not relevant to the IM/IRA. Furthermore, their location is described in the text.

Comment 15:

Section 2.3.4.3:

*The IM/IRA Plan must explain why there is no data for SED-12 or SED-13 and why there is no radioactivity data for SED-11. Related to this problem, DOE must ensure that sufficient samples are collected to perform radiochemical analyses and that these analyses are requested (refer to Appendix A-5).*

Response:

The text is in error. 1986 data exists for SED-12 and SED-13, and radiochemical data exists for SED-11. Due to prioritization of sampling activities, additional samples were not collected from stations SED-12 or SED-13. The discussion has been modified accordingly.

Comment 16:

Section 2.3.5:

*The first paragraph of this section says that total radiochemical and metals data are not discussed. This appears to be untrue based on subsequent paragraphs. The "assessment methodology that accounts for varying concentrations of suspended solids" should be presented if it is relevant to selection of the IM/IRA, or the significance of it should be clarified.*

*Surface water monitoring stations that represents seeps to be collected under this IM/IRA should continue to be sampled individually and not in aggregate.*

*The sentence beginning with "Low and very infrequent..." in the first paragraph on page 2-38 appears to be incomplete.*

Response:

Sampling of seeps tends to introduce suspended solids to the sample which necessarily results in above background total metals and radionuclides data. The degree of runoff occurring during a sampling event also effects the suspended solids concentrations. Unless sampled on the same day (virtually impossible) upgradient and downgradient comparisons of the same quarter will be influenced by runoff. DOE is still investigating an approach to evaluating interpretation of total metals and radionuclides data, e.g. normalization of total analyses by the suspended solids concentration. However, the lack of an established approach for this data evaluation does not effect the alternatives considered in the IM/IRA, i.e., requirements are largely dictated by existing water quality standards.

There is no intention of reducing the number of surface water sampling stations. The "aggregating" of stations is for ease in presenting chemical data as all these seeps should flow to SW-55 and SW-77. The sentence beginning with "low and very infrequent...." has been corrected and now reads as a complete sentence.

Comment 17:

Section 2.3.5.3:

*The data in Table 3-3 shows dissolved plutonium above ARAR, and the interpretation concludes that the plutonium is particulate, from surface soils washing into the seeps. Ground-water well 15-87 has been found to be contaminated with radionuclides. Appendix A-5 presents data indicating dissolved radionuclides above ARAR for the 903 Pad and Lip Site. Explanation of the discrepancy is required. The conclusion regarding plutonium and americium as particulates is not substantiated. The first paragraph of page 2-41 appears to be misplaced and should not be within this section.*

Response:

The discussion on whether or not plutonium is in the particulate form has been revised as follows:

Furthermore, total radiochemistry data do indicate notably higher plutonium and americium concentrations than in filtered samples, demonstrating that most of the radionuclides are in a particulate form. Therefore, the local soils represent the most direct potential source for seep contamination. However, there were traces of plutonium and americium in a few ground-water samples (highest concentrations at wells 15-87 -  $0.522 \pm 0.117$  pCi/l and  $0.031 \pm 0.148$  pCi/l, respectively) so ground water is also a potential source of radionuclides in seeps, albeit a less significant one.

The commentor's observation about the first paragraph on Page 2-41 is correct. This paragraph has been removed from the draft final version.

Comment 18:

Section 2.3.7:

*This section is supposed to summarize the contamination. A summary of how the observed data impacts the selection of an IM/IRA is appropriate, and badly needed, at this point. Instead, this section presents several unsubstantiated theories related to natural occurrence and/or evaporative concentration as explanations for values acknowledged elsewhere to represent contamination. This discussion is at best tangential to the question at hand and should be deleted in favor of an evaluation that provides the inputs required for subsequent decisions.*

*The purpose of presenting the evaporative loss theory is unclear. There is little known about waste source constituents. Until the results of the Phase II source characterization are available, the evaporative loss theory cannot be verified. Exhibition of gradients may also be due to poor source characterization. Well 29-87 could be impacted by many upgradient sources distinct from OU 2. Updated information from the Background Study should be presented to verify conclusions drawn. Conclusions regarding U234/U238 ratios are questionable given the precision of the data.*

Response:

Section 2.3.7, Summary of Contamination, has been completely revised and simplified to discuss only a summary of the analytical data gathered to date. Most of the material presented relating to the evaporative loss theory has been deleted. Section 4.1 discusses surface water contamination as it relates to the development of IM/IRA alternatives.

Comment 19:

Section 2.5:

*There is no immediate threat. There is an imminent threat posed by contaminants at OU 2.*

Response:

We have chosen not to add to Section 2.5 that an imminent threat is posed by contaminants at OU 2. The meaning of the term "imminent" is widely interpreted. The text in Section 2.5 describes the threat to the public health, and the reason for the conduct of the IM/IRA.

Comment 20:

Section 3.0, General:

*If DOE is recommending a waiver of ARARs for inorganic and/or metal constituents for this IM/IRA, then this position should be reflected explicitly within the ultimate objectives stated within Section 3.0, possibly as a summary section at the end of this section.*

Response:

The DOE is not recommending a waiver of potential ARARs. This entire section has been rewritten to encompass the provisions of the March 1990 NCP. The revised section does note that an ARAR can be waived for interim actions. A waiver for a specific potential ARAR is not requested at this time for the final IM/IRA. At the conclusion of the bench- and field-scale treatability studies, a report will be submitted detailing achievable treatment levels. At that time, the DOE may need to request a waiver of certain ARARs for this IM/IRA, or simply come to agreement on the ARARs that can be practicably attained per this provision in the FFACO/IAG.

Comment 21:

Section 3.2:

*The schedule should be updated to be consistent with the revised IAG, actual submittal dates and should also be consistent with the written guarantees made by DOE regarding operation of the IM/IRA for OU 2.*

Response:

Because the incorporation of a printed schedule creates potential conflict with possible future adjustments with the FFACO/IAG schedule for this activity, Section 3.2 now refers the reader to the FFACO/IAG for details of the schedule.

Comment 22:

Section 3.3:

*Please reference our comments on the Final Phase II RFI/RIFS Workplan (alluvial) for OU 2. Note the 14 May 1990 transmittal letter paragraph which states, in part, "Of significant importance within the comments are concerns regarding the new National Contingency Plan's (NCP) affect on the proposed ARAR analysis. . . This concern impacts all RFI/RI work at all OUs for Rocky Flats and should be taken into consideration while developing workplans and performing the work." The new NCP provisions and the specific comments made on Section 2.4 of the conditionally approved Phase II OU 2 Workplan must be properly incorporated in the ARAR analysis presented in the IM/IRA plan.*

*The revised discussion of ARARs should be condensed to cover those items relevant to the decision process, and only those items. A brief table similar to Table 4-1 could better present the pertinent information in Tables 3-3 and 3-5, which could be appended in their updated form.*

Response:

Section 3.3 has been revised to incorporate the following NCP [FR Vol 55, No. 46, 8848; 40 CFR 300.430 (e)] considerations in development of remedial alternatives:

1. Potential ARARs;
2. for systemic contaminants, concentration levels that will not cause adverse effects to the human population and sensitive subgroups over a lifetime of exposure;
3. for carcinogens, concentration levels that represent an excess lifetime individual cancer risk less than  $10^{-4}$  considering multiple contaminants and multiple pathways of exposure;
4. factors related to detection limits;
5. attainment of MCLGs (or MCLs if MCLGs are zero) if water is a current or potential source of drinking water; and,
6. attainment of Clean Water Act (CWA) water quality criteria where relevant and appropriate.

Comment 23:

Comment 23:

Section 3.3.1.3:

*The surface water quality standards referenced here do not appear to be included in the screening of probable ARARs presented in Table 3-5.*

Response:

Table 3-5, provides a screening of probable action specific ARARs whereas the discussion in Section 3.3.1.3 pertains to chemical-specific ARARs.

Comment 24:

Section 3.3.1.5:

*This section argues that radionuclide contamination is evident and should be treated to meet ARARs (item 2, page 3-25); and that uranium concentrations are due to evaporative concentration and "treatment for. . . removal would be futile and costly attempt at cleaning up the natural environment." A consistent position on the uranium contamination and the required response must be provided.*

*Item 3c in the page 3-25 listing indicates influent metals will be below ARAR due to mixing. Dilution is not considered an acceptable treatment process, and NPDES compliance is not the only standard by which the IM/IRA performance objectives are set.*

*Reasoning such as "it is prudent. . . , it is not probable. . . ," and "it is also hypothesized. . ." does not constitute a basis for decision making without documentation adequate to support associated conclusions. Documentation must include references, assumptions, and calculations used in arriving at the position stated. When necessary, decisions based on professional judgment must be presented as such and will be open to challenge by other parties.*

*The designation of SW-61 as the confluence of SW-60 and SW-59 is inconsistent with the field observations made by EPA and CDH. It is EPA understanding that SW-61 marked the flow within the concrete pipe north of SW-60. DOE must verify the location of SW-61 and reevaluate the design basis for the IM/IRA, accordingly. During a meeting held on March 13 1990, DOE committed to separately collecting the seep water flowing from SW-59 from the waters flowing from SW-60 and SW-61. Thus design basis shall be base flow from SW-60 and SW-61 and the entire flow from SW-59. Two collection systems must be installed to provide for this.*

*Outlier determinations cannot be made to invalidate VOC analyses. The IM/IRA document must be clarified within this section to indicate that the determination of outliers, for other than VOC analyses is for the sole purpose of estimating plant influent concentrations.*

*The estimated influent quality regarding metals cannot be compared to ARAR. Dilution is not an acceptable form of treatment and cannot be used as justification for waiver for ARAR. It is also inappropriate to propose the unsubstantiated evaporative concentration theory as justification of waiver of ARAR.*

Response:

Section 3.3.1.5, has been completely revised. There is no longer any discussion regarding "dilution," outliers, or ARAR waivers. Terminology like "prudent," "probable," and "hypothesized," has also been deleted. The revised text presents a brief discussion on how the IM/IRA is considered protective of human health and the environment pursuant to the March 1990 NCP.

In Section 2.3.5.2, we clarify that prior to November 1987, SW-61 was located at the outlet of the concrete pipe north of SW-60.





Comment 25:

Table 3-4:

*The use made of this information in setting process design parameters is not clear. Manipulations of the data set which impact the decision process must be fully explained and justified.*

Response:

Table 3-4, has been deleted from the draft final IRAP/EA.

Comment 26:

Table 3-5:

*The information presented here must be updated in accordance with comments presented above on Section 3.3. Also, it should be noted in the comments that the parties have not reached agreement on the applicability of NEPA to RCRA/CERCLA actions.*

Response:

Again, Section 3.3 concerns chemical-specific ARARs whereas Table 3-5 concerns action-specific ARARs. The non-agreement of the applicability of NEPA to RCRA/CERCLA actions has been noted in the comments column of Table 3-5 in the revised draft. This information, as well as the addition of NCP citations, now appear in Volume II, Table D-3, Analysis of Probable Action Specific ARARs for Remedial Actions at Operable Unit 2.

Comment 27:

Section 4.0:

*Effectiveness and implementability evaluations must recognize the dangers associated with surficial radionuclide contamination, particularly the resuspension potential. Construction procedures must incorporate the handling, characterization, and disposal requirements for excavated material established for use in the 881 Hillside IM/IRA, and the applicable RCRA LDRs.*

Response:

It is agreed that the dangers associated with surficial radionuclide contamination must be addressed and procedures developed for the proper handling (including characterization and disposal) of these contaminated materials. Section 7.1 the IRAP/EA deals with this issue and discusses how the Job Safety Analysis (JSA) procedures will control construction and operational activities at the site. Similar procedures to those developed for the 881 Hillside cleanup will be imposed on the OU 2 surface water IM/IRA construction.

Comment 28:

Section 4.1:

*The alternative analysis does not include any examination of alternatives for disposal of the treated water. Alternatives which would eliminate further discharges to the surface drainages must be*

*evaluated as part of an overall strategy to reduce or eliminate potentially contaminated inflows to downstream drinking water supplies, in accordance with the RFP Water Management Plan.*

Response:

We have not elected to evaluate alternatives for disposal of the treated water. Once the surface water is treated and can be discharged in compliance with state and Federal permits, the water is returned to its natural drainages and allowed to pass off-site. Alternative uses of the clean water could adversely affect individual water rights downgradient from the site, creating additional problems for plant operations.

Alternatives that would eliminate further discharges to surface drainages are not part of an interim action approach and are therefore not addressed. This would more appropriately belong in programs designed for total site cleanup or site water resource management.

Comment 29:

Section 4.1.1:

*The argument presented for not considering ground-water withdrawal is unconvincing. A withdrawal system is being installed at the 881 Hillside sites.*

*The selection process for surface water collection points does not appear to have included any evaluation of several drainages running southeast from the East Trenches area. Contamination potential in these drainages appears significant based on site history and the June 1988 aerial photograph indicating construction activity possibly involving installation of a ditch directing flows from surface seeps in this area to pond C-2. Justification for excluding these areas from the IM/IRA must be provided*

Response:

The argument for not being able to design an effective ground-water withdrawal system at OU 2 has been rewritten in an attempt to better explain this position. Please note EPA's comment on the draft OU 2 Ground-Water IRAP/EA in their transmittal letter dated January 9, 1990:

*"...this OU [OU 2] is difficult to address on an interim basis due to the lack of comprehensive quality data characterizing the nature and extent of contamination. It is uncertain whether the most probable imminent threat, the alluvial ground-water system. Can be effectively addressed at this time."*

Runoff southeast of the East Trenches Area was due to land application of sewage treatment plant effluent which has been discontinued. The rationale for determining the points of surface water collection is as discussed in the March 1990 meetings which is now presented in the revised draft.

Comment 30:

Section 4.1.2:

*The process used to select the candidate treatment processes must be more clearly documented. Many other process options are available, from which a handful were picked. This step must be explained, at least to the point where the reader can understand why Ion Exchange was selected for study in preference to other available technologies, even though it apparently cannot meet the stated objectives for plutonium removal. The final paragraph of the section attempts to address this question, but covers only suspended solids/inorganics removal, and offers only a number of unsupported*

conclusions. For example, some basis must be provided for the statement that reverse osmosis and membrane filtration are not cost effective in this application. Cost effectiveness alone does not provide justification for elimination of an alternative.

The fourth paragraph on page 4-5 states that "Fabric filtration may be used to remove 1 micrometer and smaller size particulates. . .". This statement is probably meant to state that it would be capable of removing 1 micrometer and larger particles.

Response:

Section 4.1.2 has been revised to present the following points more concisely:

1. The basis for treatment system design and how it is established.
2. The surface water treatment required (i.e., organic, inorganic, and suspended solids removal) and the technologies that are considered for evaluation.

In regard to ion exchange, it should be understood that this is a viable technology for inorganics removal, but that the evaluation conducted in the IRAP reveals uncertainties as to its effectiveness in plutonium removal.

Section 4.1.2 has been revised to state that removal of suspended solids down to the 1  $\mu$ m particle size range ensures optimum treatment system performance.

Comment 31:

Section 4.2:

*Update this discussion to show the screening criteria as described in the current NCP and associated guidance documents. A full evaluation of alternatives using these criteria will incorporate an assessment of potential impacts to human health and the environment, and eliminate the need for a separate treatment of these issues.*

Response:

The EE/CA criteria listed in Section 4.2 for implementability and cost evaluation conform to the requirements of the revised NCP. With regard to the effectiveness criterion, however, the revised NCP also requires that reduction of toxicity, mobility, and volume of wastes be considered. Although the EE/CA guidance is the basis for the evaluation of IM/IRA alternatives, the revised draft will examine reduction of toxicity, mobility, and volume of wastes.

Comment 32:

Section 4.2.1:

*Effectiveness criteria include reduction of toxicity, mobility and volume through treatment.*

Response:

Reduction of toxicity, mobility and volume will be added to the list of criteria in Section 4.2.1 and each alternative will be evaluated accordingly.

Comment 33:

Section 4.3:

*This section evaluates collection points, not collection techniques as stated. If flow can be measured at SW-103, then the flow should be collected at SW-103, not near B-5. Alternatives should be presented for collection of the seeps. Alternatives might be amenable to collection of water from the SW-103 seep if the sumps are not effective in collecting such an aerially extensive seep.*

Response:

Seepage at SW-103 is not proposed for collection in the revised draft. The reasons for this change are threefold:

1. there will be disruption of the wetland by construction of an elaborate drainage system that is required because of the large size of the seep;
2. construction will be difficult because of the location of the seep on a steep hillside; and
3. the only organic contaminant ( $\text{CCl}_4$ ) is at a low concentration ( $< 10 \text{ ug/l}$ ), and the plutonium is likely of surface soil origin and therefore the seep represents an insignificant contribution of plutonium via runoff to the drainage basin above the retention ponds.

Alternative methods for collection of the seeps is not presented because the technique of diversion at the source was prior decided at the February and March 1990 meeting between EPA, CDH, and DOE. However, less detail has been provided on the collection system in the revised draft to allow maximum flexibility at final design for devising the most effective collection system.

Comment 34:

Section 4.3.1.1:

*CS-53 is not included in the listing of surface water collection points, either here or in Section 6.1.1, yet it is shown on Figure 4-2.*

*A sensitivity analysis should be performed to evaluate the cost impact against the increased protectiveness offered by altering the collection system to minimize the need for bypassing during high flows, when the flux of some target contaminants could be the highest.*

Response:

The first comment is acknowledged. Reference to CS-53 has been included in the Final Draft IRAP/EA.

Although a sensitivity analysis may normally be appropriate, the rationale for flow rate design was based on an agreement reached between the DOE and regulatory agencies (including EPA) that the IM/IRA should use a "base flow rate" as the basis for interim remedial action design. Section 4.3.1.1, Surface Water Collection by Diversion at the Sources, has been expanded to clarify this point. Paragraph two of this section now reads as follows:

Design flow rates for surface water collection systems CS-59, CS-61, CS-55, CS-53, CS-63, and CS-64 are based on flows from stations SW-59, SW-55 plus SW-77, SW-53, SW-63, and SW-64, respectively. A "base flow rate" is defined here as the maximum observed flow, excluding flows related to high precipitation events. The DOE and regulatory agencies have agreed that only "base flows" will be collected from the OU 2 surface water seeps and in-stream monitoring

stations. Base flow rates for each of the collection systems are established by examination of the available historical flow data at the locations of the proposed collection systems. Historical flow data for SW-59 and SW-61 are listed in Tables 4-2 and 4-3, respectively.

Comment 35:

Section 4.3.2.3:

*The point of this discussion is completely obscured by circular logic. The section should be clarified.*

Response:

A detailed evaluation of surface water collection at Ponds B-5 and C-2 has been deleted from the IRAP/EA. Dismissal of this alternative is discussed in the revised draft.

Comment 36:

Section 4.3.2.4:

*The probability of selecting this option cannot be known before the screening has started. Show the costs and let the comparative analysis support the choice.*

Response:

Please see the response to the previous comment.

Comment 37:

Sections 4.4.1 and 4.4.2:

*Since the same treatment technologies will be applied to remove both the suspended solids and radionuclides, discussing them separately confuses the discussion and clouds the comparison.*

*The need for treatability studies is specifically mentioned as a negative factor as it relates to Ion Exchange. This is also a valid concern for advanced membrane filtration, and should be included as such in the comparative evaluation.*

Response:

Although the advanced membrane filtration system (now referred to as the cross-flow membrane filtration) is utilized for both suspended solids and radionuclides removal, the same is not true for the other treatment technologies evaluated. Contact filtration (now referred to as Granular Media Filtration) is only used for suspended solids removal. Similarly, ion exchange is only discussed as an alternative for radionuclide (and metals) removal. By discussing suspended solids removal and radionuclide removal separately for cross-flow membrane filtration, we are allowing comparison of these specific attributes of the technology to other applicable technologies that do not necessarily accomplish both objectives.

Section 4.4.2.2, Ion Exchange, does mention the "recommendation" that bench- and pilot-scale treatability studies be conducted before this technology is used for this surface water IM/IRA. It is not meant, nor is it stated, as a particular negative factor. Reference to specifically recommending

treatability studies in this paragraph has been deleted. Instead, in Section 6.4 it is noted that bench- and field-scale treatability studies will be conducted to determine the effectiveness of cross-flow membrane filtration, granular-activated carbon, ion exchange and other technologies in treating OU 2 surface waters.

Comment 38:

Section 4.4.1.2:

*Treatment effectiveness for plutonium cannot be certain, as the behavior of this contaminant in surface waters is not adequately characterized. If the DynaSand filter is effective, the effluent should not require downstream treatment for radionuclide removal.*

Response:

The treatment effectiveness paragraph has been revised to clarify the distinction between plutonium existing in a colloidal state versus the removal of radionuclides which may be in a dissolved state. This paragraph now reads as follows:

The continuous upflow sand filter is as effective at removal of suspended solids as conventional flocculation/coagulation and rapid sand filtration. Plutonium, americium, metals and, to a lesser extent, uranium will be largely removed in this unit because plutonium and americium exist predominantly as colloids in natural waters (Orlandini, 1990).

Comment 39:

Section 4.4.2.1:

*The document must explain the relevance of the discussion of plutonium chemistry and stability at pH different than that expected within the environment. It is unclear why it is expected that the plutonium hydroxide would dewater given the media to be treated. Explain how it is expected that when adsorption affinity decreases mobility in soil water environment decreases. Cesium 137 is not naturally occurring.*

Response:

The discussion on the five oxidation states of plutonium is intended to provide the reader with an understanding of the behavior of plutonium in the natural environment. Stability at higher pH's is relevant to treatment for plutonium removal. Loss of water from plutonium hydroxide is driven by thermodynamics and is not necessarily related to being in an aqueous medium.

The statement is incorrect regarding plutonium mobility. This has been changed to read:

This reduction in charge density and eventual conversion to an anionic form at pHs above 9 decrease its adsorption affinity for soils and thus increases its mobility in the soil/water environment.

The reference to Cesium-137 occurring naturally has been deleted from the draft final IRAP/EA.

Comment 40:

Section 4.4.3:

*Table 4-1 indicates treatment plant design will be based on the presence of methylene chloride and vinyl chloride at concentrations requiring treatment. Effectiveness is evaluated based on the presumption that these compounds present no concern. This discrepancy must be resolved, and a consistent, appropriate evaluation applied to treatment system effectiveness. Protectiveness demands the selected treatment system demonstrate adequate performance for all contaminants (and concentrations) reasonably anticipated based on historical data; it is not prudent to remove most high concentrations from the data set and then perform an analysis that "assumes" several known contaminants are not present.*

Response:

Table 4-1, Basis for the Design of Surface Water Treatment Plant, has been updated and excludes the organic constituents, vinyl chloride, methylene chloride, and acetone. The rationale behind their removal is based on their not being present at SW-61 where water is to be collected for the IM/IRA. Outliers are not removed from the data set in the draft final IRAP/EA.

Comment 41:

Section 4.4.3.1:

*Upflow modes through GAC columns prevent short-circuiting through the column. Verification that the GAC is not a mixed waste must take place prior to shipment for regeneration. Only two of the VOC contaminants to be addressed through this IM/IRA are specified in the referenced Federal Register as treatable by GAC. Although there is advantage to testing and utilizing a treatment process for VOCs that is different than that proposed for OU 1 IM/IRA, it is ineffective to select an alternative that is known from the start to be incapable of treating contaminants of concern within the seeps at OU 2.*

Response:

This commentor is correct about upflow design of GAC columns. However, in checking with a major vendor of these units, most water treatment systems still utilize GAC systems in a down flow mode. This change in flow mode may be made during final design, but does not impact the concept of utilizing a GAC system. We feel the reference to the *Federal Register* citation is still appropriate. Considerable data now exists that support effective removal of many of the chlorinated solvents present in the surface water. Reference to choosing a treatment system different from that used at OU 1 has been deleted.

Comment 42:

Section 4.4.3.2:

*It should be explicitly stated which VOCs were bench scale tested for OU 1 IM/IRA so that a comparison to the VOCs present within the OU 2 media to be treated can be made.*

Response:

VOC contamination of ground water at various areas of the plant site have many similar compounds. The compounds present at OU 1 are many and are listed below:

VOC Contaminants

881 Hillside Area

TOC, mg/l  
COD, mg/l  
Benzene, ug/l  
Toluene, ug/l  
Xylene, ug/l  
Acetone, ug/l  
MEK, ug/l  
Methylene Chloride, ug/l  
1,1-Dichloroethane, ug/l  
1,1-Dichloroethene, ug/l  
Trans-1,2-Dichloroethane, ug/l  
1,2-Dichloroethane, ug/l  
1,1,1-Trichloroethane, ug/l  
Trichloroethylene, ug/l

Comment 43:

Section 4.4.3.3:

*If GAC is ineffective for treatment of methylene chloride, vinyl chloride and acetone, then air stripping in series with a vapor phase carbon adsorption process will result in media transfer of these constituents, not treatment.*

Response:

Use of a vapor phase carbon adsorption process to remove contaminants such as methylene chloride, vinyl chloride, or acetone may be more effective than liquid phase carbon. These compounds are difficult to remove directly from water by adsorption because of their strong affinity for the water, i.e., high solubility. Therefore, vapor phase carbon is predicted to have a higher adsorption capacity for these compounds.

Comment 44:

Section 5.2:

*The discussion of technologies for suspended solids/radionuclide removal is confusing and internally contradictory. If ion exchange won't work because the plutonium is colloidal, then why does dissolved plutonium exceed ARAR? Will uranium meet ARARs, or only to the extent practical because it is all natural? The weaknesses of the analysis undermine the conclusions presented here, which must be written with appropriate support in earlier sections.*

*The final paragraph of this section indicates the selection of the IM/IRA treatment process was actually based on a desire to try something other than the system chosen for the 881 Hillside, rather than on the foregoing analysis. While it is true that development of a treatment performance data base is an important objective of the overall RFP program, Areawide Treatability Studies are included in the*



*program for that purpose. That is not a valid basis for proceeding with an IM/IRA which ignores documented evidence of contamination and thus may not adequately address the potential threats to human health and the environment present at OU 2.*

Response:

Sections 2, 3, 4, and 5 have been revised to clarify the potential effectiveness of the candidate treatment technologies. Section 2 discusses the existence of colloidal plutonium in a fraction ( $<0.45 \mu\text{m}$ ) established as "dissolved." There are no longer any for specific ARAR waivers for the final IM/IRA, nor is there any focus on naturally occurring radionuclides.

The statement regarding the need to look at an alternate technology to that selected for the 881 Hillside has been deleted.

Comment 45:

Table 5-1:

*Flow variability does not significantly limit UV/Peroxide implementability. Proper process design and system operation can accommodate flow changes. The effect of this requirement will be accounted for in the analysis as an additional cost item.*

Response:

Real time monitoring for VOCs coupled to hydrogen peroxide metering equipment would be necessary for UV peroxide to perform over wide ranges of organic loading. It is not known whether such technology is available, or if available, if it would be dependable. Alternatively, large equalization basins could be used to dampen organic loading fluctuations. Either of the above solutions would substantially increase the cost of this alternative.

Comment 46:

Section 6.4:

*The use of an "existing unit" at RFP for advanced membrane filtration treatability testing has not been previously mentioned. The details of this effort, its role in the IM/IRA, and its integration into the areawide studies must be specified.*

Response:

Section 6.4 has been expanded to discuss the upcoming treatability studies and their integration into the project. It has not been determined whether the existing cross-flow membrane filtration unit will be used in the treatability study, and it is therefore no longer mentioned.

Comment 47:

Sections 7 and 8:

*These sections are not necessary or appropriate as part of an IM/IRA plan and should be removed. Environmental impacts can be appropriately addressed within the alternative selection process.*

Response:

DOE elects to keep Sections 7 and 8 in the document so that it is clear that NEPA has been addressed. A DOE notice issued on August 2, 1988, entitled, "Integration of Environmental Compliance Processes," (DOE-N-5400.4), established a DOE policy for meeting CERCLA and NEPA requirements for hazardous substance remedial action projects. Quoting directly:

Effective immediately, it is DOE's policy to integrate the requirements of the NEPA and RI/FS processes for remedial actions under CERCLA.

**SECTION 2**  
**RESPONSE TO PRC COMMENTS**

SECTION 2  
RESPONSE TO PRC COMMENTS

Comment 1:

Section 1.1, Page 1-2, Paragraph 2:

*The text states that "...the phased approach is to investigate alluvial and bedrock migration pathways first, and then to subsequently investigate ground-water contaminant sources." This statement could be clarified by changing bedrock to hydraulically-connected bedrock.*

Response:

This recommendation is incorporated into the draft final IRAP/EA.

Comment 2:

Section 1.1, Page 1-2, Paragraph 3:

*This paragraph implies that the mobile field treatability test units will include an ion exchange test unit if bench scale tests indicate it is feasible. However, ion exchange has been eliminated as a treatment option in Section 6 of this document. This discrepancy should be resolved.*

Response:

The treatability studies will examine the effectiveness of cross-flow membrane filtration, GAC, ion exchange as well as other technologies in treating OU 2 surface waters. The design of the preferred IM/IRA may be modified based on the results of these studies. This discussion is provided in Section 6-4.

Comment 3:

Section 1.1, Page 1-3, Paragraph 1:

*The text implies that the carbon adsorption units will be installed and operational prior to installation of the microfiltration units during the field treatability test. It should be noted that operating carbon adsorption units without pretreatment with the microfiltration unit to screen out radionuclides may result in a mixed waste.*

Response:

There will be provision for a unit process to remove suspended solids simply to keep the carbon from fouling. Nevertheless, spent carbon used in the field treatability study may become contaminated with radionuclides. The spent carbon will be tested and handled according to the standard waste management procedures of the RFP.

Comment 4:

Section 2.3.5.3, Page 2-1, Paragraph 1:

*The statement that "ground water" does not appear to be contaminated with radionuclides" is contradicted by data presented in Appendix A-5 of this report. Appendix A-5 shows that dissolved plutonium concentrations of greater than 1.0 pCi/l were detected at surface water stations SW-53 ( $1.89 \pm 0.85$  pCi/l) and SW-58 ( $1.06 \pm .374$  pCi/l) and SW-52 ( $.369 \pm .195$  pCi/l).*

Response:

The commentor is correct regarding ground water and conclusions presented in this section have been modified accordingly. However, the existence of plutonium in a size fraction less than  $0.45\mu$  does not mean it is necessarily dissolved nor of ground water origin.

Comment 5:

Section 3.3.1.5, Page 3-22, Paragraph 3:

*Justification for removing high values from the data set before computing concentration averages must be provided. The deletion of high values from the data set appears to have skewed the average concentrations to the low side. This is not a conservative approach. It should be demonstrated that the use of Dixon's Test is appropriate for this data set, given the data objectives.*

Response:

The draft final IRAP/EA has been revised to not exclude outliers. The entire data set is, therefore, considered in the IRAP/EA.

Comment 6:

Table 3-3:

*Acetone has not been included in this table even though the value of  $65 \mu\text{g/l}$  that was detected at surface water station SW-101 is above the regulatory level of  $50 \mu\text{g/l}$  and is not reported in Table 3-4 as an outlier. The table should be revised to include acetone.*

Response:

The correction has been made to Table 3-4. As discussed in the response to the previous comment, the entire data set is considered in draft final IRAP/EA.

Comment 7:

Section 4.3.1.1, Page 4-10, Paragraph 3:

*The design flow of 13 gpm measured at station SW-103 may be an inadequate basis for the design of collection system CS-103, which is located approximately 600 feet downgradient in an adjacent (and apparently larger) drainage. The flow rate for CS-103 should be revised upward to reflect the larger drainage area contributing to the flow at CS-103.*

Response:

The large size of SW-103 and its location several hundred feet up a steep hillside make collection of surface waters at this seep extremely difficult. The large area of the seep would require an elaborate collection and drainage system, installation of which would likely have adverse effects on existing wetlands. Installation is further hampered by the difficulty in construction equipment reaching the site and operating on a steep topography. For these reasons, and because contaminant concentrations are low, collection of water at this seep is no longer considered for this IM/IRA. The text in Section 4.1.1 has been modified accordingly as well as the associated figures.

Comment 8:

Section 4.3.1.1, Page 4-13, Paragraph 2:

*The basis for locating collection system CS-103 600 feet downgradient from the seep source is not explained in this section. The chosen surface water collection alternative has been justified in part because it prevents organic compounds from volatilizing as the surface water moves downgradient towards the retention ponds. The collection system for surface water station SW-103, as depicted in Figure 4-2, would allow contaminated surface water to travel approximately two-thirds of the distance to pond B-5 before collection. The location of collection system for SW-103 should be justified.*

Response:

Please see our response to comment 8.

Comment 9:

Section 4.3.1.1, Page 4-13, Paragraph 2:

*The text should explain why a 5,000-gallon sump is proposed for collection system CS-103, which has a design flow of 13 gpm, while a 1,000-gallon sump is proposed for CS-61, which has a design flow of 38 gpm (Figure 4-3).*

Response:

As discussed in the response to Comment 8, collection of surface water at seep SW-103 is no longer considered in the IM/IRA. A 1,000-gallon sump at CS-61 gives a storage capacity of approximately 26 minutes which is adequate since CS-61 is hard-piped to the treatment system.

Comment 10:

Section 4.3.1.1, Page 4-13, Paragraph 3:

*Soil excavated during the construction of CS-55 should not be used to construct a runoff division berm. This soil is likely to be contaminated, particularly with plutonium and americium, and may contaminate diverted surface water.*

Response:

Surface water run on diversion berms will be constructed with clean fill. For cost estimating purposes and until chemical data is collected, soils excavated during installation of the IM/IRA diversion and collection systems are assumed to be disposed of as hazardous mixed waste.

The text in Section 4.3.1.1 has been modified to reflect this waste management practice.

Comment 11:

Section 4.4.2, Pages 4-28 through 4-36:

*In order to be consistent with the effluent requirements presented in Table 4-1, the removal of gross alpha, gross beta, and americium contamination should be addressed in this section.*

Response:

The literature indicates that americium has one oxidation state in aqueous solutions: Am(III). Under oxidizing and near-neutral conditions expected in surface water, AM(III) strongly complexes with colloidal material and should exist in particulate form. Since americium exceeds its potential ARAR only for total concentrations (i.e. dissolved plus particulate), the effluent requirement is expected to be attained in the process of removing suspended solids.

Since gross alpha is largely from uranium and particulate forms of plutonium and americium, the gross alpha ARAR is expected to be achieved. Most of the gross beta arises from uranium 238 daughters (i.e. thorium 243 and protactinium 234). Since these daughters exist predominantly in particulate form, the gross beta effluent requirement is also expected to be achieved.

The text in Section 4.4.2 has been modified to address americium, gross alpha and gross beta removal as described above.

Comment 12:

Section 4.4.3.1, Page 4-37, Paragraph 3:

*The assumption that methylene chloride and acetone will not be present at SW-61 may be incorrect on data contained in Appendix A. This appendix shows that 20 µg/l of methylene chloride was detected at SW-61 while none was present in the associated blank. Methylene chloride was also detected at a concentration of 44 µg/l without associated blank contamination at station SW-60, immediately upgradient of SW-61. Acetone was detected at a concentration of 65 µg/l at station SW-101, which is also upgradient of SW-61. Acetone was detected in the seeps southeast of 903 Pad (SW-53 and SW-77) as well.*

Response:

Prior to November 1987 SW-61 was located at the exit of the concrete culvert, north of SW-60. Therefore, the 20 ug/l of methylene chloride was detected upgradient of the proposed collection location (i.e. CS-61). After November 1987, SW-61 samples were obtained from its present location (i.e. the confluence of SW-59, SW-60 and the effluent of the concrete culvert) where acetone has not been unambiguously detected.

As stated in the IRAP/EA, methylene chloride, acetone, and vinyl chloride have never been detected above their detection limits at the proposed CS-61 location. The text in Section 4.3 has been revised

to discuss rationale for not including these three constituents in the basis of design of the surface water treatment plant.

Comment 13:

Section 6.1.1, Pages 6-1 through 6-3:

*This section should include a schedule for the collection of surface water from sumps at collection systems CS-53, CS-55, CS-63, and CS-64.*

Response:

Section 4.3.1.3 has been modified to include a schedule for collection of surface water from CS-53, CS-55, CS-63, and CS-64 based on design flows to those collection systems (see Table 4-4). The design flows along with water storage capacity at each station results in the following collection schedule:

<u>Collection Station</u>	<u>Minimum Time Period Between Tank Truck Transfers (Days)</u>
CS-53	1
CS-55	7
CS-63	7
CS-64	1.5

Section 4.3.1.3 has also been modified to include the likely transportation route between the collection stations and the treatment plant along with an estimate of the average tank truck mileage per week.



**SECTION 3**  
**RESPONSE TO CDH COMMENTS**

SECTION 3  
RESPONSE TO CDH COMMENTS

GENERAL COMMENTS

Comment 1:

*The Surface Water Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document 903 Pad, Mound, and East Trenches Areas OU 2 contains major deficiencies which must be addressed. The collection system at Upper South Walnut Creek must be modified to collect the waters of SW-59 at the source, and the base flows of SW-60 and SW-61. The schedules for the plan must be revised to show field activities beginning no sooner than ten days after release of the responsiveness summary.*

Response:

A considerable number of changes have been made to the draft final surface water IRAP/EA that address the commentor's concerns. Section 4.3.1, Surface Water Collection by Diversion at the Sources, specifically discusses a collection system (CS-59) at surface water monitoring station SW-59. The schedules formerly contained in Section 3.2, Interim Remedial Action Schedule, have been deleted. Because schedules were being adjusted during preparation of the IRAP/EA, the reader is now referred to the draft FFACO/IAG for milestones of specific activities.

## SPECIFIC COMMENTS

### Comment 2:

#### Section 2.3.2.2 (Page 2-28):

*Explain what type of quarterly "multiple sampling" was used to conclude barium and strontium are the only trace metals which consistently exceeded background. Is "multiple sampling", several samples taken from the same location over an extended period of time or more than one aliquot analyzed from a single large sample?*

### Response:

Section 2.3.2.2, Inorganic Contamination, discusses metals in the second paragraph. The reference to multiple sampling refers to taking samples from the same location over an extended period of time. Based on a further review of the analyte data, the paragraph on metals has been re-written as follows:

Aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, strontium, vanadium and zinc exceeded background in one or more wells in the second quarter of 1989. Table A-8 (Appendix A), a summary of multiple sampling events (up to fourteen samples collected from each well during 1987-1989), shows that only a subset of these analytes repeatedly exceed background (upper limit of the tolerance interval) and/or exceed background by a wide margin. The sporadic exceedances of background, and the absence of apparent gradients in metal concentrations with respect to IHSSs, hinders drawing definite conclusions as to whether these constituents are derived from IHSSs (EG&G, 1990b).

### Comment 3:

#### Section 2.3.5.3 (Page 2-39):

*The description of three of the stations, SW-59, SW-60 and SW-61, is inconsistent with field observations made by CDH and EPA during a site visit where EG&G and DOE staff members, Scott Grace, Tom Greengard, and Tom Olsen were also present.*

### Response:

Section 2.3.5.2, Upper South Walnut Creek, discusses the location of several surface water monitoring stations, including SW-59, SW-60, and SW-61. Prior to November 1987, SW-61 was the concrete culvert north of SW-60. However, after November, 1987 a sign establishing the location of SW-61 was placed at the confluence of this culvert, SW-60 and SW-59. Sampling of SW-61 subsequent to November 1987 was at this confluence. A sentence regarding the location change of SW-61 has been added to the text.

### Comment 4:

#### Section 2.3.5.3 (Page 2-40):

*There are three seeps listed in the first sentence which starts, "Of the two seeps at the East Trenches Area. . ." SW-65 is south of the trenches, SW-103 is northeast of the trenches and SW-101 is northwest of the trenches and west of the road. Which two seeps of the three listed are referred to?*

Response:

Reference to SW-101 is a typographical error. This should be SW-103. The paragraph, Section 2.3.5.3, Seeps at the East Trenches Areas, has been revised in the draft final IRAP/EA to read as follows:

Of the two seeps at the East Trenches Areas (SW-65 and SW-103), SW-65 has no apparent organic contamination, and SW-103 has the constant presence of  $\text{CCl}_4$  at concentrations less than 10  $\mu\text{g/l}$ .

Comment 5:

Section 2.3.7 (Page 2-42):

*The circumstantial evidence supporting an evaporative concentration hypothesis is not a substitution for a summary of the contamination present. A summary should consist of a brief description of the contaminants present and their sources. In any case, circumstantial evidence does not form an acceptable criteria for any decision regarding remediation.*

Response:

Section 2.3.7, Summary of Contamination, has been revised to more accurately reflect the title of this section. Most of the discussion pertaining to the evaporative loss hypothesis has been deleted. This section is now a concise discussion of the organics, metals, and other inorganics that are found above background at OU2.

Comment 6:

Section 2.4 (Page 2-43):

*Define the statistical criteria used to determine whether a particular datum is "A" or "R"? State the conditions under which a breach of quality assurance (QA) can occur.*

Response:

The Rockwell International Quality Assurance/Quality Control Plan: Environmental Restoration Program, Rocky Flats Plant, January 1989, provides the guidelines for determining the classification of a particular datum. EPA data functional guidelines are used for validating organic and inorganic (metals) data. Data validation for radionuclides and "major ions" data have been developed by the DOE. The determination of a particular datum as "A" or "R" is not a statistical determination but rather a qualitative evaluation by an independent data validation sub-contractor to EG&G of the datum's level of quality based on an analysis of the sample handling and analytical records.

The phrase "Breach of Quality Assurance" has been deleted from the draft final IRAP/EA.

Comment 7:

Section 3.2 (Page 3):

*The Task Description and Bench Scale Treatability Studies and Field Treatability System schedules need to be adjusted to reflect a schedule agreed upon by all parties to the IAG. The public comment period and system construction cannot overlap. "Field activities" cannot begin until the responsiveness summary has been available to the public for ten days.*

Response:

Your comment is acknowledged. DOE will adhere to the schedule in the current draft FFAO/IAG.

Comment 8:

Section 3.3 (Page 3-2):

*The last sentence on the page lists the state and federal acts which guide the Environmental Restoration Program, the final phrase concludes, "...with emphasis on CERCLA and RCRA." As this is the case, NEPA scheduling should be assimilated into the RCRA/CERCLA process contained in the draft IAG without prolonging interim actions.*

Response:

Section 3.3, Compliance with Applicable or Relevant and Appropriate Requirements (ARAR), has been completely revised to reflect provisions of the March 1990 National Contingency Plan (NCP). Reference to other Acts, including NEPA, have been eliminated. It is agreed, however, that the NEPA process must be factored into the RCRA/CERCLA process without prolonging interim actions.

Comment 9:

Section 4.3.1.1 (Page 4-7):

*The collection system as described for SW-59, SW-60 and SW-61 misses the point of executing a surface water IM/IRA for OU-2, because these three surface water collection points produce the majority of the surface water to be treated. The collection system for this area should collect SW-59 at the source and the collection point for SW-60 and SW-61 needs to be evaluated, in accordance with the design parameters discussed at the March 14 and 15, 1990, meetings at Roy F. Weston.*

Response:

The commentor is correct in these observations. The final draft IRAP/EA includes a separate collection system for SW-59, and an in-stream collection system for SW-60 and SW-61 in the vicinity of SW-61.

Comment 10:

Section 4.4.3.2 (Page 4-45):

*The implementability section of the UV/Peroxide discussion indicates that a low maintenance, highly effective ground-water treatment unit was visited locally. Where in Colorado is this UV/Peroxide unit located? A description of the local system and its applicability and variability from the selected remedy for the surface water IM/IRA should be presented.*

Response:

The subject local UV/Peroxide oxidation system is at the IBM facility in Boulder County. It currently treats water with low concentrations of TCA (10 µg/l) but has effectively treated ground water with considerably higher concentrations. It's performance is indirectly applicable to the IM/IRA in that it treats a chlorinated solvent, albeit, not one of the chlorinated solvents predicted to be present in the collected surface water. However, TCA is known to be one of the more difficult chlorinated solvents to oxidize.

Comment 11:

Section 6.1.2.1 (Page 6-5) Main Reaction System:

*On what surface are Uranium and Plutonium expected to "adsorb?" What precipitation reactions are expected to occur between the radionuclides and the precipitating agents? Is the expected produce of these reactions a metal salt precipitate or a radionuclide salt? The use of other precipitating agents such as Magnesium Hydroxide should be explored, to minimize waste solids generation.*

Response:

The commentor is referred to Section 4.4.2 for a discussion of the radionuclide removal mechanisms pertaining to cross-flow membrane filtration. The radionuclides should precipitate as hydroxides, and/or be adsorbed to the ferric hydroxide floc that is produced. Lime is added to simply raise the pH, and should not produce significantly more sludge than with the addition of magnesium hydroxide.

Comment 12:

Section 6.1.2.1 (Page 6-8) Solid Dewatering Section:

*Define "reprocessing" as it applies to the filtrate in the solid dewatering system.*

Response:

Reprocessing is defined as recycling the filtrate back through the system for treatment.

Comment 13:

Section 6.1.2.1 (Page 6-7) Neutralization System:

*This section is incomplete. The description is minimal. How is the neutralization acid added to the tank? What pH guidelines does the operator work under? What is the monitoring schedule for pH checks and acid addition? What acid is used?*

Response:

Section 6.1.2.1, Neutralization System, is intentionally brief. The designs presented in the Surface Water IM/IRA area are of a conceptual nature and not the level of detail the commentor is requesting. Once the field and bench-scale treatability studies are completed, the final design will provide the requested level of detail. Sulfuric acid is the typical acid used in neutralization systems.

Comment 14:

Figure 6-1 (Page 6-4) Dewatering Equipment:

*The diagram shows solids from the filter press either disposed of or "recovered." Does recovery include plutonium recovery? The discussion of the process arrows around the settling tank is inadequate. How are the return solids to and from the settling tank controlled?*

Response:

The diagram indicating solids recovery was in error. There was never any intention of recovering plutonium or other metals from the sludge, and therefore, Figure 6-1 in the revised draft has been changed accordingly. With respect to the settling tank, as the diagram indicates, solids are not returned to the concentration tank. However, supernatant from the settling tank and filtrate from the filter press is returned to feed equalization for retreatment. Figures 6-1 and 4-4 were also simplified with regard to the process flow lines around the settling tank.

Comment 15:

Section 6.2.2 (Page 6-10):

*The surface water treatment system must be maintained by the use of strict process control. The estimated two hours per shift of operator attention does not appear to cover all the tasks listed in Section 6.1.2 in addition to the four tasks listed in Section 6.2.2. The tasks listed in Section 6.1.2 in part are,*

*pg 6-6 powdered sulfate will be added manually in a prescribed amount.*

*pg 6-6 lime slurry will be prepared by filling a tank with water then adding a prescribed quantity of lime to the tank manually. . .*

*pg 6-7 the slurry removal rate will be adjusted manually, to maintain the desired solids concentration.*

*pg 6-8 the press will be emptied once every five days.*

Response:

The estimate of time required to operate a cross-flow membrane filtration system was based on discussion with designers and operators of those systems. The tasks outlined by the commentor above do not consume large blocks of time and are not necessarily done on a daily basis.

The commentor should keep in mind that the design contained in the surface water IM/IRA is a conceptual design and undoubtedly will undergo considerable revision prior to construction of the operating treatment plant. Specifics of the treatment plant's operational requirements will be addressed during the final design.

Comment 16:

Section 6.4 (Page 6-11):

*Where is the existing advanced membrane filtration system in operation at the Rocky Flats Plant? Under what conditions does this unit operate? What are the existing unit system parameters? If this unit is to be used as part of a treatability study, where and when will the results of this study be available to the regulatory agencies? Will information from the treatability study be available within a time frame appropriate to allow fine tuning the operating parameters of the advanced membrane filtration system selected?*

Response:

The treatability studies are currently scheduled to begin in early 1991. A summary report of the treatability study findings will be submitted to the regulatory agencies upon completion of the program. Those details have been incorporated into the revised Section 6.4 and it now reads as follows:

The existing cross-flow membrane filtration system is within the PSZ and was used at one time to remove radionuclides from laundry water. A treatability study plan is being prepared which will specify whether this unit or another unit will be most appropriate for the bench and field-scale treatability studies. The schedule for treatability studies is identified in the current draft FFACO/IAG.

Comment 17:

Section 2.3.6 (Page 2-41):

*Although I am not familiar with radiological standards, the likely question which is not answered here is "under what conditions does the State DOE standard apply?"*

Response:

Without further clarification we do not understand what is meant by "State DOE standard". The DOE guidelines are established to protect human health from plutonium exposure and apply to all DOE facilities. The IM/IRA is also required to abide by the recently promulgated Clean Air Act and any state statutes which may apply.



Comment 18:

Section 2.3.7 (Page 2-44):

*I am not familiar with hydrologic conditions at the RFS; however, I would suggest three questions in regard to the discussion of inorganic concentrations. Could the elevated inorganic concentrations measured at the well farthest away from the SWMU reflect migration of those contaminants from elsewhere, such as an anthropogenic source? Is there a gradient associated with the concentrations in the well's vicinity which suggests direction of migration? Are changes in the water table elevation at the RFP demonstrable (e.g., ground-water quality data for the front range)?*

Response:

There are no known non-SWMU contamination sources upgradient of the monitoring wells that could contribute to the observed contamination. The direction of potential migration may be assessed from the ground water flow gradient, however, clear concentration gradients are absent. Finally, variations in water table elevation are demonstrable. Water table elevation data was collected along with well concentration data.

Comment 19:

Section 2.5 (Page 2-44):

*Does the NPDES permit and the IM/IRA address VOCs and radionuclides? What is meant by "facilitate contaminated water management?"*

Response:

The surface water IM/IRA addresses VOC's and radionuclides throughout the document. Section 2.3, Contaminants - Description and Sources, typically breaks down the discussion of contaminants into volatile organic compounds, metals, and radionuclides. Discussions on the individual treatment systems also discuss these same categories where appropriate.

The Rocky Flats Plant NPDES permit is currently under review and will be modified. In the interim, the new Colorado Stream Standards have been imposed on the RFP site and those will most likely be incorporated into the revised NPDES permit when issued. VOCs and radionuclides and addressed by both.

"Facilitate Contaminated Water Management" means that, by implementing this IM/IRA, this program will allow the RFP site to manage its contaminated surface water of OU2 on an interim basis and in a manner consistent with the final remedial action at the site.

Comment 20:

Section 3.3.1 (Page 3-3):

*Is there a precedent or guidance for the proposed screening process for potential ARARs? Are the RCRA Land Disposal Restrictions, etc., health based? If not, is there a provision for substitution with values which are (e.g., based on risk estimates generated from cancer potency factors, RfDs, Water Quality Criteria)?*

Response:

The revised National Contingency Plan presents the guidance for identification of ARARs [40 CFR 300.400(g)]. RCRA Land Disposal Restrictions are action-specific ARARs which are technology-based as described in Section 3.3.3. Text will be added to Section 3.3.3 to note that LDRs are technology-based, action specific standards.

Comment 21:

Chapter 7:

*Is there adequate oversight or accountability of/by JSA/HS&E?*

Response:

The JSA has been superseded by the ER Program Health and Safety Program Plan (ERHSPP) which further requires development of a Site-Specific Health and Safety Plan (SSHSP). EG&G has also developed a Plan for the Prevention of Contaminant Dispersion (PPCD). It is DOE opinion that the oversight by the HS Department is comprehensive, rigorous, and provides satisfactory accountability for protection of workers during construction, and the public health.

Comment 22:

Paragraph 1 (Page 7-7):

*The information provided leaves it unclear if the non-cancer risk summation is properly applied. Are all non-cancer related risks being summed or only those related to similar organ systems?*

Response:

The analysis methodology discussion at the beginning of Section 7.5 has been revised to indicate that the toxicity assessment for carcinogenic and non-carcinogenic effects of chemicals was performed in accordance with EPA's "Risk Assessment Guidance for Superfund, Vol. 1, Human Health Evaluation Manual" (12/89). This guidance assumes that the potential for non-carcinogenic effects posed by multiple chemicals equals the sum of the hazard quotients (exposure level divided by the reference dose) for each individual chemical.

Comment 23:

Paragraph 3 (Page 7-7):

*What is the basis of the 30-year exposure period assumption?*

Response:

The subject paragraph was revised to indicate that the exposure period is conservatively assumed to be 30 years, a time frame established simply for present worth cost computations. The duration of the remedial action is anticipated to be significantly less than 30 years.

Comment 24:

Paragraph 1 (Page 7-8):

*Not able to evaluate.*

Response:

Without a more specific comment, it is difficult to respond specifically to the commentor's concerns. However, references utilized for dose conversion factors for inhalation of radioactive materials and DOE limits are occupational and non-occupational doses. The paragraph was revised to incorporate more recent DOE guidance on non-occupational doses.

Comment 25:

Page 7-12 through 7-18:

*Quantitative assumptions and calculations used in estimating adverse health outcome risk are not provided and therefore cannot be assessed.*

Response:

The beginning of Section 7.5 has been revised to more clearly document the analysis methodology. Transportation impacts and assumptions (pgs. 7-16 to 7-18) are believed to be adequate as described and no revisions were made with the exception of the addition of a discussion of off-site transportation impacts associated with the shipment of solidified filter sludge.